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LTE is only for high-speed services!

By Richard Swardh, Senior Vice President, MNO for Comtech EF Data

This second piece in my myth buster series focuses on the notion that LTE is all about high-speed. Press releases, newsletters and LinkedIn posts from the satellite industry are full of new and groundbreaking achievements in LTE top speed while using satellite as backhaul. While it is true that it is quite easy to achieve very high speed to a single user using LTE over satellite basically matching the max throughput of a satellite modem, it has no bearing on real use cases in the markets satellite typically serves. The quest among vendors in the satellite industry to outdo each other in what top speed is possible to achieve using LTE is misleading the customer base and misses the whole point of what LTE is all about. As an industry, we owe it to ourselves to try to understand what the real drivers are behind LTE over satellite and to seek the truth of what matters to Mobile Network Operators. Read on and I'll explain why.

Long Term Evolution or LTE is the natural upgrade path to higher speed data services for mobile operators running GSM, 3G or CDMA networks. LTE is also commonly referred to as 4G LTE, which was first standardized in 2008. Its foundation is an all-IP-based flat network architecture in the Core Network and a new radio interface from the base stations (now called eNodeB) using OFDM in the downlink and FDMA in the uplink. The radio interface can operate in both Frequency Division Duplexing (FDD) and Time Division Duplexing (TDD) modes and can make use of carrier aggregation to bond together channels of different widths in different frequency bands to enable very high data throughput.

LTE Advanced

To most end users, LTE networks are synonymous with very high data rates that in some commercial networks today can provide speeds exceeding several hundred Mbps in the downlink to a single smartphone user. In the latest iteration of the standard called LTE Advanced, LTE will finally become a true 4G standard as defined by the ITU by achieving 1 Gbps of download speed. This is done by bonding together 60MHz of spectrum in different frequency bands using 256 QAM modulation and 4x4 Multiple Input/ Multiple Output (MIMO) antenna systems. While it will likely be another year or so before handsets supporting

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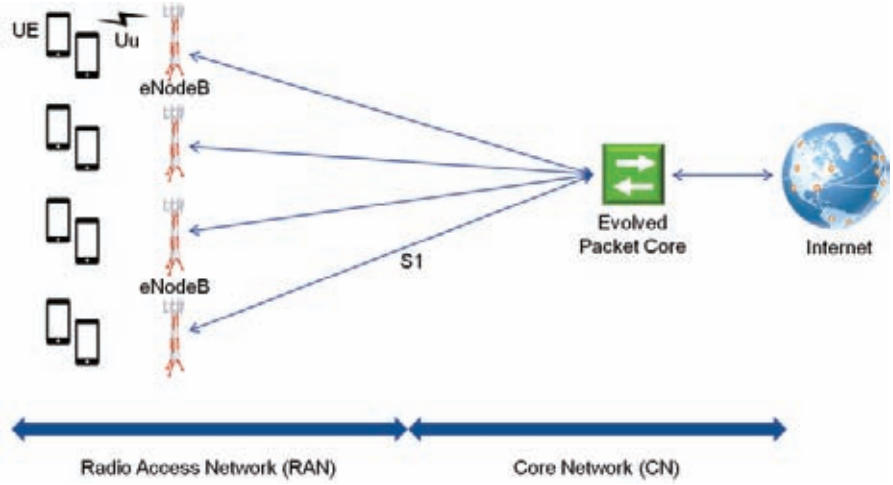

Gigabit speeds (called Category 16 terminal) will be available commercially from major vendors, it is astonishing what data rates LTE has managed to achieve in its still early life.

So, is LTE all about just high-speed services then? Let me challenge that myth and examine some of the reasons behind why LTE is the fastest growing wireless standard ever.

The ability to offer end users with very high data rates over LTE certainly gives a Mobile Network Operator (MNO) some marketing bragging rights. However, what really matters to an MNO's bottom line are LTE's various innovations that enable the cost per bit delivered to an end user to be significantly lower than what is possible with existing GSM and 3G technologies. A very efficient and interference-tolerant radio interface with flexible bandwidth channels in many frequency bands bonded together coupled with the latest modulation and coding techniques ensure the best use of the most valuable asset an MNO has, namely licensed spectrum. An all-IP flat network architecture called Evolved Packet Core delivers low latency and offers the scalability and operational efficiency needed to support data services at a lower cost per bit than within the GSM or 3G ecosystem. Most of these innovations, although many times aimed at reaching higher and higher data rates not only benefit consumers and enterprises looking for fast connections, but also ensures that an MNO can support use cases requiring low-to-medium data rate services more efficiently. Increased spectral efficiency and faster delivery of data means that more users can be supported within a given licensed spectrum. A clear example of this is a recent addition to the standard called Machine Type Communication (LTE-MTC). This is a new low data rate and long range enhancement to the LTE radio interface that allows for billions of devices to connect to the Internet using very low cost and power-efficient LTE modems that can run on two AAA batteries for more than 10 years. LTE-MTC is designed for the Internet of Things (IoT) and enables MNOs to offer new machine to machine (M2M) services very cost efficiently while re-using existing LTE infrastructure. Interesting for the satellite industry is that some of the upcoming LTE-MTC deployments are in very remote areas or in mobility markets (air, sea) where satellite has a strong value proposition creating another good synergy between satellite and mobile technologies.

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Embracing LTE

Today, there are several examples of MNOs around the world embracing LTE over satellite for delivering data services to their subscribers more efficiently than via GSM or 3G technologies. A few of these LTE deployments are aimed at very advanced use cases achieving tens and even hundreds of Mbps to a single end user. However, most deployments are, in fact, for traditional rural deployments where an average data rate around a few Mbps to a single end user is sufficient many times over.

The primary advantage for MNOs that deploy LTE-based satellite backhaul is the ability to address new markets that may have not been previously profitable. Essentially, regardless of what data rates are supported to end users, the cost per bit delivered is more than 50 percent less than it would have been using GSM or 3G networks for a similar throughput. So, while the technical capabilities are there, LTE in the satellite backhaul use case is not only about delivering the highest possible data rate to an individual end user, but about being able to deliver data services to consumers and enterprises at a lower cost per bit enabling a better business case for the MNO. Lower cost per bit delivered to end-users is a key reason why LTE is the fastest growing wireless standard ever and why it will enjoy tremendous success together with satellite backhaul. ■